I. Winkler's foundation. A rail is supported with a series of springs with the stiffness $\alpha$ per unit length (elastic foundation). At its end, a force $F$ is applied. What shape assumes the rail under this load?

II. A thin, flexible rod lies on a smooth horizontal surface. What length $x$ of the rod will take off under the action of a vertically oriented force $F$, applied at the end of the rod? What shape has this section?

III. A composite consists of a rigid base, an elastic layer and a film that can be assumed to be inextensible. What form will assume the film when trying to tear it off? The length of the composite be $L$ is, and it is pulled symmetrically on both sides. The displacements and the slope of the film in the deformed state is assumed to be very small everywhere.

IV. Determine the bending stiffness of a beam consisting of three plates with elastic moduli $E_1, E_2, E_3$.

V. With a thorn of a plant, the experiment shown below was performed. Determine the elastic modulus of the material of the thorn.

Experimental data:

- $F = 4.15 \cdot 10^3 N$
- $y = 2.5 \cdot 10^{-6} m$
- $L = 553 \cdot 10^{-6} m$
- $h = 10 \cdot 10^{-6} m$
- $r_{1,\text{max}} = 30 \cdot 10^{-6} m$
- $\tan \theta = \frac{r_{1,\text{max}}}{L} = \frac{30}{553}$